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THE VETERINARY JOURNAL

A MONTHLY REVIEW OF VETERINARY SCIENCE

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The Veterinary Journal.

DECEMBER, 1934.

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The last of the old College.

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Sub-Editor:
GLADSTONE MAYALL, M.R.C.V.S.

DECEMBER, 1934.

Editorial

THE REBUILDING OF THE ROYAL VETERINARY COLLEGE.

THE photograph in the frontispiece will be seen with mixed feelings by old students of the London College, who thus see the pictorial evidence of the demolition of the last block; the housebreakers having made a clean sweep of the other buildings a short time before.

The difficulties of arranging the quarters for the necessary teaching of the respective classes have been great at times, but the reward is in sight, and before another two years have passed the London College will take its place, without being ashamed, amongst the Institutions of its kind in any part of the world. THE VETERINARY JOURNAL has always lent its columns with practical sympathy to the appeal, the first great comparison between the schools of the Continent and our own being made through its columns.

The article by Colonel Sir Merrik Burrell (who is one of the best friends the veterinary profession ever had) in the present issue emphasises the necessity for adequate veterinary research and the value returned to Agriculture and the Public Health service from money expended in this way. His figures are convincing, and when the new laboratories are completed we shall have in London a college not only second to none in the world, but worthy of a nation who set their love for the animal on a very high plane and see that the laws on the subject are strictly obeyed. We wish the College authorities every success in the new opportunities which lie in front of the student of the future.

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General Articles

THE ROYAL VETERINARY COLLEGE.
The National Importance of Veterinary Education.*

By Lieut.-Col. SIR MERRIK R. BURRELL, Bt., C.B.E.

THE value of domesticated farm animals in Great Britain is approximately £156,000,000. The annual value of the meat produced is about £75,000,000, and of the milk, well over £60,000,000 on the farm. These figures are nearly doubled by the time the produce reaches the consumer. To these huge amounts is to be added the value of 84,000,000 head of poultry with a production valued at £26,500,000 per year. But this is only half the story from the veterinary point of view, which has to cover also the 2,000,000 horses used in agriculture, commerce and sport, the individual value of many of the latter exceeding £1,000, and in a few cases reaching £50,000. It also has to include over 3,000,000 dogs whose annual value cannot be measured in terms of money, great as that is, so much as in terms of the affection of their owners for them. And then we have the cats. We must also remember the incalculable value of our livestock in building up on correct lines the domestic animal population of the whole world, and especially of our Empire.

With this huge responsibility on our shoulders, what have we done to save preventable suffering to the animals for which we profess, hypocritically, to have more regard than any other race? What have we done to save annual monetary losses, totalling millions, from death and lowered productivity? The almost incredible and shameful answer is: "Less than any other highly civilised community!" In every other well-ordered European country, well-built and adequately equipped veterinary colleges exist. Germany and France spend more in maintenance of veterinary education in one year than the total of Government grants in this country over 100 successive years. Even Soviet Russia is far ahead of us in this respect.

The minds of the charitably inclined public have been led somewhat astray. Clever propaganda by secretaries of all sorts of societies, some good, some indifferent, and some really bad, has drawn many hundreds of thousands of pounds from the pockets of kind but unthinking people to do a very limited amount of good. One well-advertised police court case of cruelty is a better draw than the fact that one million pounds worth of sheep die each year in Scotland alone from distressing diseases. Money is poured out to support clinics where the animals are tended by unqualified people. These do their best, no doubt, but lack the necessary knowledge either to diagnose or to treat correctly. And yet up to quite recently a private benefaction for the betterment of the veterinary profession was rare indeed.

* Reprinted, by permission, from *Country Life*, November 17th, 1934.

The prevention and proper treatment of many diseases can only be accomplished after much further research, and first-class research workers can only be produced by the best possible education. That must be the essential foundation of future progress. Fortunately, both the Government and the public have begun to realise this at last. The latter, by subscribing something over £100,000, have enabled the Governors of the Royal Veterinary College to fulfil the condition laid down by the Government, which will now give £150,000 towards the rebuilding of the College. The old inadequate buildings, with the rain percolating through their walls and roofs, with their inefficient drains, lack of light, and all their squalor and dreariness, have gone. And now the new buildings, aiming at 100 per cent. efficiency and no extravagance, are rapidly taking their place. But the final cost of building and equipment will be nearer £300,000 than the £250,000 available after purchasing the site, and the income necessary to staff and maintain the new College on the lines officially laid down will be £25,000 a year larger than before. Endowment of the various professorial Chairs is needed urgently. The generosity of Mr. and Mrs. C. C. Courtauld has already endowed the salary of the Professor of Animal Husbandry, and the money collected by the Tail Waggers' Club will help endow the Professor of Canine Surgery.

The College, in spite of its difficulties, and in the midst of re-building, is training 330 students ; running a highly efficient pathological research institute ; conducting a poor patients' free clinic, through which passed, in 1933, 7,220 patients, and the staff of which did 1,819 operations ; also an animal hospital through which passed 7,227 patients and in which 475 major operations were performed.

There is endless research work waiting to be done, but this huge volume of teaching and routine work leaves no time for research by the overworked staff. It has been, and still is, a terrible struggle, but we shall win through now, and the turning of what has been well described as a national disgrace into something to be proud of will be the reward of our courageous and loyal staff and long-suffering students.

Unfortunately, the veterinary profession is a poor one, and the education for it long and costly. The students have to pass the same standard of general education as doctors before starting on a five years' expensive course. So further progress must be dependent on State aid and private benefaction. But there is no argument as to its not being worth while both from the economic and humane standpoints.

Besides the Royal Veterinary College in London there is a modern building at Edinburgh, the Dick Veterinary College, quite good so far as it goes, but inadequate in size and understaffed. A very small veterinary school is attached to Liverpool University ; and a veterinary college at Glasgow is doing good work with hopelessly inadequate facilities.

Indeed, Great Britain has little to be proud of in its past treatment of its veterinary profession. Our aim must be adequate buildings, efficient staffs,

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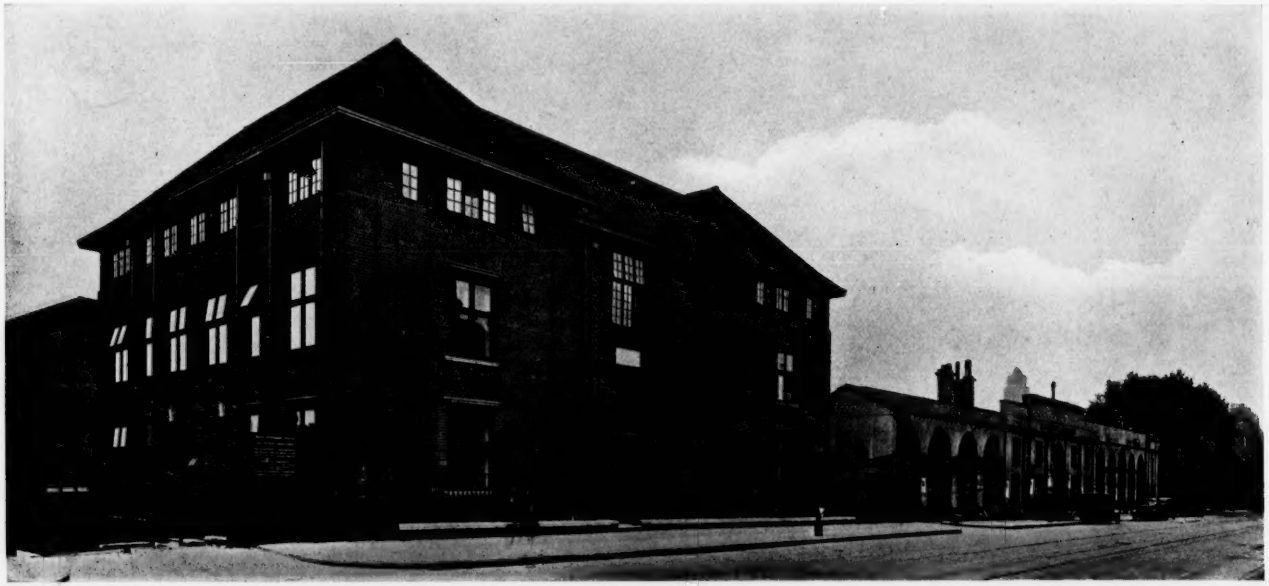
properly paid and with opportunity for research work, and the acquisition by the colleges of University status by becoming attached as schools of their neighbouring universities. It only wants the awakening of the public consciousness to this necessity for its final accomplishment. The matter is one of urgency, as the demand for high-class veterinary surgeons already exceeds the supply, and is increasing rapidly, both at home and in our Colonies.

From the accompanying plan and photographs some idea can be gained of the progress and ultimate scope of the buildings. Externally, rigid economy has imposed on the architect, Mr. H. P. G. Maule, the utmost simplicity. As yet, too, no general architectural *coup d'œil* is possible, since the main block (H on plan), containing the administrative quarters, laboratories, lecture rooms and students' quarters, has only just been begun. It will occupy the whole area of the old quadrangle giving on to Great College Street, and the new buildings already erected will be ancillary to it.

Judged by Continental standards, the area involved is very small; at Leipzig University the area devoted to veterinary science amounts to some twenty-three acres, and the buildings consist of detached blocks, each devoted to its particular subject. When the question of re-building was being considered it was, indeed, suggested that the College be moved to some favourable provincial centre such as Cambridge or Reading, where it would have ample space. But the Departmental Committee appointed by the Ministry of Agriculture to thrash the whole matter out decided that, if the old site could be utilised to accommodate adequate modern buildings, the claims of London should be upheld. During 1929, Mr. Maule, who had already built the Pathological Research Institute, evolved a plan whereby this could be done, provided a small additional strip of land at present occupied with old working-class property could be acquired. The sketch plans then prepared for hospital and teaching accommodation for 300 students have, it is interesting to note, been carried out with little alteration. With the exception of the main block (H) in course of erection, and of the main stables and large animals' operation block and X-ray department (J on the plan), which will be placed on the additional site when that area can be cleared of houses, the actual hospital buildings are now complete, and consist of the following:

(*a*) *Beaumont Animals' Hospital*, which is the out-patients' department for small animals. The most striking feature of this is the operating theatre on the first floor. This building contains, in the basement, two wards for dogs and other small animals, an isolation reception-room for doubtful-looking cases, a post-mortem room, and various other offices. On the ground floor is a large reception hall for patients and their owners, connecting with an inspection room, a pharmacy, and a dressing-room. On the first floor is the operating theatre with sterilising room, instrument room, small lecture theatre, two private rooms for staff surgeons, and a small ward into which patients would go immediately after an operation. Above this are quarters for the head-stableman and three resident house-surgeons.

The adjoining block, B, is the *Canine Hospital*, the basement of which contains



THE ROYAL VETERINARY COLLEGE. BEAUMONT ANIMALS' HOSPITAL.
The old entry to the quadrangle beyond latter has now been demolished and the main block (H on plan) is taking its place.

(*Article by* Lt.-Col. Sir Merrik R. Burrell, Bt., C.B.E., *page* 478)

(*Photo copyright "Country Life"*)

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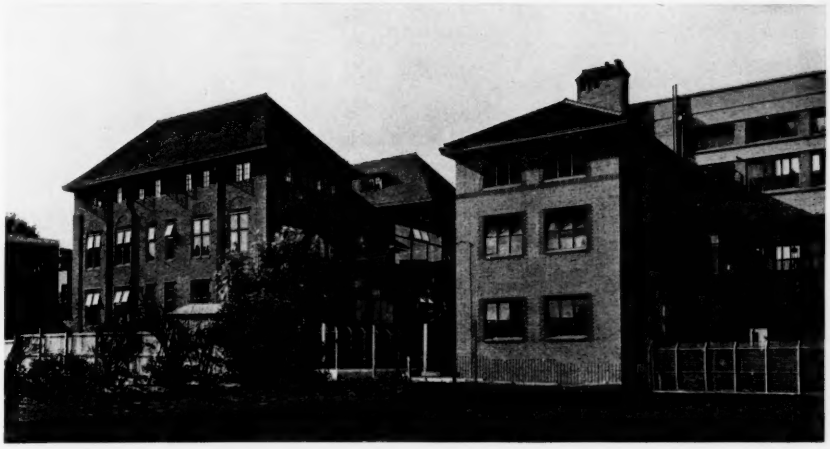
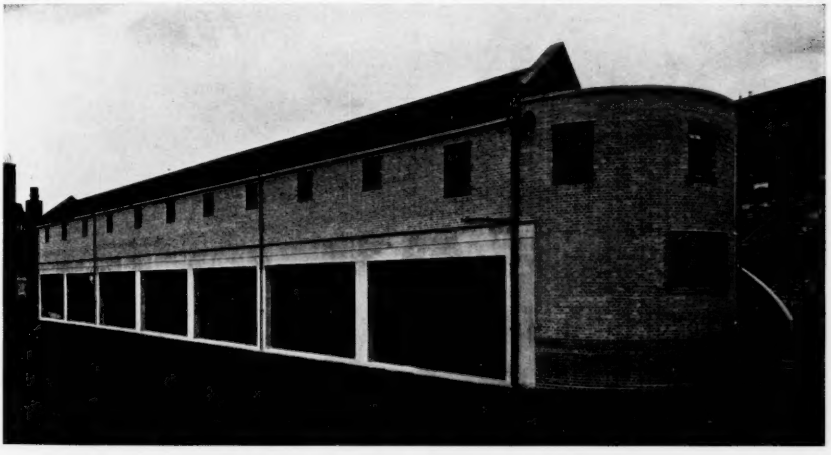


BEAUMONT HOSPITAL AND CANINE WARDS.
The lunettes light open-air wards.



The New Ride, with Horse Boxes and Kennels over.

(*Article by* Lt.-Col. Sir Merrik R. Burrell, Bt., C.B.E., *page* 478)

(*Photos copyright "Country Life"*)

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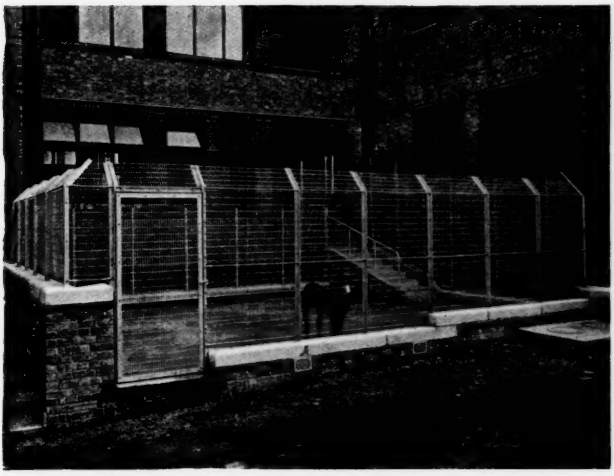

Dogs' Exercise Yard, Canine Hospital.

Cow House. Department of Animal Husbandry.

(*Article by* Lt.-Col. Sir Merrik R. Burrell, Bt., C.B.E., *page* 478)

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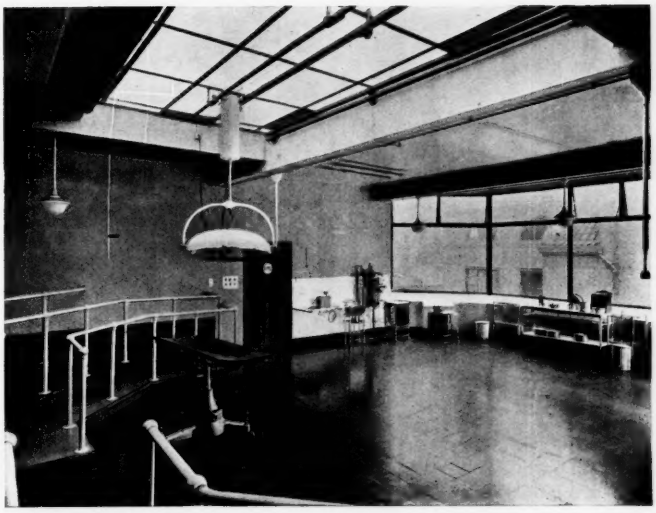
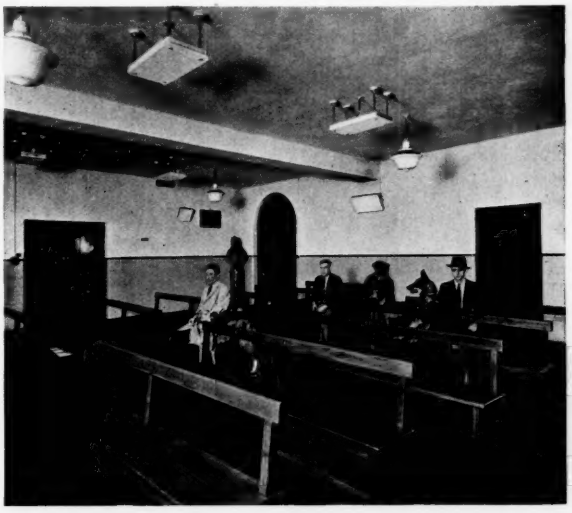


The Canine Operating Theatre in the Beaumont Hospital.



The Waiting Room in the Out-Patients' Department.

(*Article by* Lt.-Col. Sir Merrik R. Burrell, Bt., C.B.E., *page* 478)

(*Photos copyright "Country Life"*)

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the kitchens and laundry and various other rooms, and which communicates, by an underground passage, with the basement of the Beaumont. The remainder of this building contains wards, two operating theatres, dressing-rooms and exercise yards, two of the latter being on the ground level communicating with skin wards and used exclusively for skin patients ; while on the top floor are two covered exercise yards and a roof exercise yard partly covered and partly open. At the present moment half this building is being used for temporary purposes to accommodate students for lectures, etc., during the remainder of the building operations. The ground floor on the east side contains a small dairy, cowhouse, and quarters for other animals ; and the floors above this will probably be devoted to animal husbandry. There is ample connection by means of lifts and staircases, and these two buildings, when in final occupation, will, it is believed, represent the most modern and up-to-date equipment for canine surgery and medicine.

Adjoining this is the *Ride*—D—the ground area of which is utilised for testing the soundness of wind and limb. Above this are six horse-boxes, together with forage and stableman's quarters, approached by a ramp. At the southern end are isolation kennels with complete quarters for attendant: kitchen, bed-sitting-room, bathroom, etc.

Farther to the south is E, the *Post-mortem Block*, consisting of cold-storage room and plant, preparation room, post-mortem demonstration theatre, students' laboratory, readers' laboratory, and a microscopic diagnosis room. The interesting point about this building is that it is one of the smallest of its kind in Europe, but it is believed that it will be absolutely adequate for its purpose. It is mechanically ventilated and warmed, and is so placed on the site as to have convenient access to the pathological department of the College proper and the *Pathological Research Institute*—F on plan.

The *Pathological Research Institute* was designed by the architect some seven or eight years ago, and by the special wish of the Departmental Committee the present design had to provide for the actual physical connection of this building with the main College block.

This connecting wing (G) consists, on the ground floor, of animal quarters for pathological cases, and on the upper floor, which is at the same level as the ground floor of the College, there will be a big pathological museum connecting directly with the Institute and the pathological department of the College. The Principal of the Pathological Institute will also be in charge of the pathological department of the College. This building is at present being used temporarily for various teaching purposes, until such time as the College is complete.

As will be seen from the block plan and the foregoing description, the area is none too large for its purpose, but the buildings have been so disposed as to give ample circulation, with ready access to every part of the College and Hospital. The only thing which it will lack will be the greater amenity, which nearly all the Continental colleges possess, of gardens, trees, and more spacious lay-outs.

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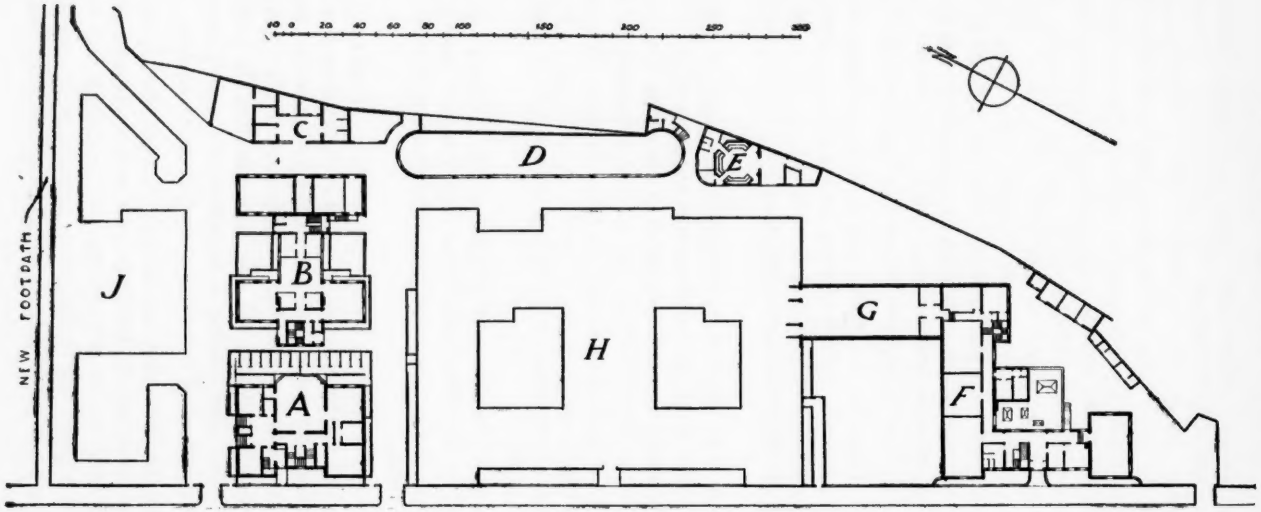

PLAN OF THE ROYAL VETERINARY COLLEGE

(A) Beaumont Animals' Hospital; (B) Canine Hospital; (C) Reception Stable and Garages; (D) Ride; (E) Post-mortem Block; (F) Pathological Research Institute; (G) Pathological Museum; (H) Main Block; (J) Proposed position of Main Stable and large Animals' Operation Block and X-ray Department.

ABSTRACT FROM THE AGRICULTURAL RETURNS OF ENGLAND AND WALES, 1934.*

Horses.

At 885,500, the total number of horses continued to show a decline, but whereas the number of horses used for agricultural purposes (including mares) and " other horses " shows a net reduction, the numbers of unbroken horses and foals are larger. The increase of 2,600 (6.3 per cent.) in the number of foals is greater than the increase of 2,100 (5 per cent.) returned last year, and is due to an increase in the numbers of foals from heavy horses, those from the lighter

	1934	1933	Increase		Decrease	
	No.	No.	No.	Per cent.	No.	Per cent.
Horses used for agricultural purposes (including mares for breeding)	596,200	645,600	—	—	49,400	7·7
Unbroken horses (including stallions):						
One year and above ...	88,700	84,600	4,100	4·8	—	—
Under one year	43,800	41,200	2,600	6·3	—	—
Other horses	156,800	131,200	25,600	19·5	—	—
Total of horses...	885,500	902,600	—	—	17,100	1·9

breeds being about the same as last year. It is possible that the decrease of 49,400 (7.7 per cent.) in the numbers of horses used for agricultural purposes (including mares) and the increase of 25,600 (19.5 per cent.) in the numbers of " other horses " are exaggerated, and may to some extent be due to a number of horses previously returned as used for agricultural purposes being returned this year as " other horses."

Cattle.

The numbers of cattle and pigs have increased by 0.6 per cent. and 8.1 per cent. respectively, but sheep have declined in numbers by 8.1 per cent., and horses by 1.9 per cent.

There has been an annual increase in the total number of cattle in the country since 1930, and while the total of 6,659,000 returned this year is a record, it is

	1934	1933	Increase		Decrease	
	No.	No.	No.	Per cent.	No.	Per cent.
Cows and heifers in milk ...	2,213,600	2,179,000	34,600	1·6	—	—
Cows in calf, but not in milk ...	363,900	358,200	5,700	1·6	—	—
Heifers in calf	417,200	418,000	—	—	800	0·2
Other cattle—						
Two years and above... ...	1,042,000	996,400	45,600	4·5	—	—
One year and under two ...	1,368,200	1,356,900	11,300	0·8	—	—
Under one year	1,254,100	1,311,700	—	—	57,600	4·4
Total of cattle	6,659,000	6,620,200	38,800	0·6	—	—

* Published by the Ministry of Agriculture and Fisheries, August, 1934.

only 38,800 (0.6 per cent.) above last year's total. A further increase of 39,500 in the dairy herd creates another record; cows and heifers in milk increased by 34,600 (1.6 per cent.), cows in calf but not in milk by 5,700 (1.6 per cent.) while heifers in calf showed a small reduction of 0.2 per cent. in their numbers. In England the increase in the dairy herd was general, the few decreases being small. In Wales an increase in the south was counterbalanced by a decrease in the north. The total number of " other cattle " is practically the same as in 1933, an increase in the numbers of those one year and above being balanced by a decrease in the numbers of those under one year. " Other cattle " two years old and above show an increase of 45,600 (4.5 per cent.), and those one year old and under two years of 11,300 (0.8 per cent.). With the exception of the northern division, the decrease in the numbers of " other cattle " under one year (including calves) was general and amounted to 57,600 (4.4 per cent.).

Sheep.

At 16,517,700, the total number of sheep in the country was smaller by 1,572,200 (8.1 per cent.) than in 1933. The number of ewes kept for breeding fell by 465,200 (6.0 per cent.) to 7,302,700. The decrease was general, except that Cumberland and Brecon returned larger numbers than last year. " Other

	1934	1933	Increase		Decrease	
	No.	No.	No.	Per cent.	No.	Per cent.
Ewes kept for breeding	7,302,700	7,767,900	—	—	465,200	6.0
Other sheep—						
One year and above	1,731,600	2,424,000	—	—	692,400	28.6
Over six months and under one year	525,600	7,898,000	—	—	414,600	5.2
Under six months	6,957,800	—	—	—	—	—
Total of sheep	16,517,700	18,089,900	—	—	1,572,200	8.1

sheep " under one year old totalled 7,483,400, a decrease of 414,600 (5.2 per cent.) on the year. In England the decline was general, Cumberland and Westmorland being the only counties to return increases worthy of mention. In Wales there was a net increase of 2 per cent. The numbers of " other sheep," one year old and above, show a consistent fall throughout the country, and at 1,731,600 are 692,400 (28.6 per cent.) fewer than last year.

Pigs.

The total number of pigs in the country was returned as 3,318,900, or 249,800 more than in 1933, an increase equivalent to 8.1 per cent. There was an increase in each class. Sows kept for breeding increased by 44,300 (10.9 per cent.) to 449,900. " Other pigs " over two months old by 58,000 (3.1 per cent.) to 1,902,100, and " other pigs " under two months old by 147,500 (18 per cent.) to 966,900. The increase in the numbers of sows and " other pigs " under two

	1934	1933	Increase		Decrease	
	No.	No.	No.	Per cent.	No.	Per cent.
Sows kept for breeding	449,900	405,600	44,300	10.9	—	—
Other pigs—						
Over two months	1,902,100	1,844,100	58,000	3.1	—	—
Under two months	966,900	819,400	147,500	18.0	—	—
Total of pigs	3,318,900	3,069,100	249,800	8.1	—	—

months old was general throughout the country, but in the case of " other pigs " over two months old there was a decrease in numbers in the eastern, north-eastern and south-eastern divisions and in Wales, the remainder of the country generally showing larger numbers.

FIELD OBSERVATIONS ON SOME GUIANA INSECTS OF MEDICAL AND VETERINARY INTEREST.*

By J. G. MYERS, Sc.D., F.R.E.S., F.Z.S.

Imperial Institute of Entomology and Imperial College of Tropical Agriculture.

Introduction.

In the course of a number of journeys in the interior of northern South America, in the search for new natural enemies of plant-pests, I was inspired by Professor P. A. Buxton, of the London School of Hygiene and Tropical Medicine, to collect for him incidentally a few insects of medical interest. This was the more easy since they were attracted not only to ourselves, but also to our Indian carriers, our horses and pack-bullocks. The material was determined by the Imperial Institute of Entomology, to whom it was submitted by Dr. Buxton. I am indebted to Dr. Buxton for the interest he has taken in these often scrappy collections. He is not responsible for any opinions expressed below. In order to avoid a longer or a more indefinite geographical title I have used the term " Guiana " in its widest sense to include the area between the Orinoco, the Atlantic coast, the lower Amazon and the Amazon-Orinoco watershed. This is strictly correct, since both Venezuela and Brazil recognise Guiana provinces, making two additional to the three owned by European Powers.

" Eye-flies."

In most tropical countries there exist, in addition to hordes of biting and sucking insects, some few—few, that is, in species, but legion as to individuals—which though they neither sting nor bite, are an especial source of torment and pain from their persistent habit of entering the eyes. Some are worse for their numbers and endless persistence, others for the acute pain produced by their secretions. Buxton found a species of *Sarcophaga* addicted to this habit in Samoa, while the writer suffered in Central Australia from the similar attentions of a

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small bush-fly, *Musca vetustissima*, related to the house-fly. In the area under consideration there are four main types, only two of which are true flies, the others being stingless bees (*Trigona*) and a small Heteropterous bug (*Amnestus*).

Hippelates is a genus of small blackish Oscinid flies widely distributed in North and South America and the West Indies. In the Rupununi and Rio Branco savannahs a species is in places almost intolerable, but its distribution is curiously restricted, the chief limiting factor being wind. The greater part of this large savannah region is swept by an almost constant prevailing wind from the north-east, and it is only in the lee of such mountains as the Kanukus, or on small savannahs surrounded by forest, that it is abundant and troublesome. Occasionally in the high woods, for instance at the base of the Kanukus, small Indian provision-fields, and the banks of sheltered creeks are heavily infested. In the latter situations it combines with the kaboura fly or *piúm* (*Simulium* spp.)* to make life unbearable.

The other fly is a small grey Anthomyiid, which, although not so specialised and persistent as *Hippelates* and *Trigoma* in its attacks on the eyes, is still at times an almost intolerable nuisance, especially when associated with the former and with *Simulium*, as it was in the three localities in which I encountered it. These places were well sheltered, forested creek beds, two on the Uraricuera-Cotinga savannahs at about 2,000 feet (December, 1932), and one in virgin lowland forest at the base of the Kanuku Mountains (Napi Creek, January, 1934).

The *Trigona* (probably more than one species) is a minute stingless bee, actually one of the smallest bees in the world. It is stronger and even more persistent than *Hippelates*, and causes much greater pain than the latter when inside the eye, owing to its harder texture, greater resistance and size. It is particularly abundant both on the Rupununi savannahs and the upper campos of the Rio Branco, where abrupt rocky mountains, clothed with low, dry, semi-deciduous forest rise abruptly from the plains (*e.g.*, Shiriri mountain, and Serra de Anaru). On the lee side and base of such hills, camps in the dry season are rendered almost uninhabitable by these bees, unless one employs heavy smudge-fires or mosquito nets. In the case of these bees, the surroundings are so dry, and water so scarce, that moisture is probably the main attraction to one's eyes, but this will not explain the behaviour of *Hippelates* in moist rain-forest clearings. Both the flies and the bees also lick perspiration greedily.

The fourth " eye-fly," which occurs also in Trinidad, and is known there very appropriately as " pepper-fly," belongs to another category in that its entrance

* There are very marked restrictions in the altitudinal and vegetational distribution of these flies, but as the species are not yet determined I reserve further details. The association between *Hippelates* and *Simulium* is sometimes quite close. Thus, at Marutuaka I observed a small *Simulium* biting my wrist when a *Hippelates* arrived and pushed the biting fly vigorously with its head, thrust out it proboscis and tried to suck the edge of the wound occupied by the mouth-parts of the biter. It pushed again and again, forcing the *Simulium*, pivoted on its bite, round nearly in a circle. Finally it burrowed under the latter, and pushed till the *Simulium* stood on its head, and finally flew away, with its feed uncompleted. The *Hippelates* at once rushed to the vacated puncture. It had taken no notice of the droplets of clear fluid which the *Simulium* emitted from time to time from its anus.

into one's eyes seems to be largely accidental. At least it is fortunately not so persistent nor so abundant as the others. It is a stoutly-built, though tiny, shining brown bug (*Amnestus* sp.), which during its struggles in one's eye, liberates a secretion the effect of which can only be compared to that of Cayenne pepper. The agony, moreover, endures for several hours after the removal of the insect.

Myiasis caused by Cochliomyia.

Cochliomyia macellaria is the most abundant blow-fly of the region, often attracted in great numbers to carrion and to forest camps. On the Barima River, British Guiana, North-west District, it was, for instance, present in swarms at a semi-permanent camp of Carib timber-cutters, where it settled in large numbers on one's food, needing a switch in constant employment. In a similar rain-forest camp on the Coppename River in Dutch Guiana, in April, 1929, when constant rain and excessive humidity made it almost impossible to dry one's garments, a pair of heavy woollen socks were so thickly interpenetrated with eggs that they had to be thrown away. Paex (1929, p. 249) records that on the Venezuelan llanos, during the rains, when it was impossible to keep dry the spare clothes and blankets, these became in a few hours covered with myriads of fly maggots.

In the Rupununi savannahs one of the most troublesome affections of stock, especially in the wet season, is fly-blow or " bicheiro." It attacks branding sores, castration cuts, and other wounds, and follows on severe ear-tick (*Dermacentor nitens*) infestation. I ascribed this to the same fly, *Cochliomyia macellaria*, but Professor Buxton informs me that a new species, *C. americana* Cushing and Patton, only distinguishable with the greatest difficulty, has been shown to be responsible in North America for myiasis, usually attributed to the older species. Flies reared by me from a deep wound in the thigh of a bullock on the Ichilibar Savannah, Pakaraima Mountains, were similarly identified as *C. americana*. Incidentally the Macusi Indian cowboy, after gouging out the larvæ with a finger, plugged the wound with pounded tannia (root of the edible Aroid, *Xanthosoma* sp.), and plastered it with fresh cow-dung. The usual dressing on the Rupununi savannahs is a mixture of creolin and lard, which is also employed against the ear-tick.

In the forested sections of the British Guiana Cattle Trail, *Cochliomyia** was exceedingly troublesome, producing myiasis in wounds caused almost nightly, and often very plentifully, by the bites of vampire bats (*Desmodus* sp.) on our pack bullocks. Barrington Brown (1876, p. 371) records a severe case of myiasis in a sloth. Further study is needed to determine whether *C. macellaria* ever produces myiasis, or whether *C. americana* is always and everywhere the fly responsible.

* I assumed it to be *C. macellaria*, which was breeding in incredible numbers in the carcases of numerous bullocks which had died on the trail just before our passage ; but in the light of this newer information it was more probably *C. americana*.

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In the course of blow-fly studies in England, during which large numbers of carrion-feeding Muscoids were reared, it was a practically invariable rule for the flies to emerge from the puparia in the morning. I was therefore surprised to find on the Uraricuera River, in December, 1932, that immense numbers of *C. macellaria* which had developed in the carcase of a dead capybara were emerging from the puparia in the evening, just before sunset. Cicadas almost always do this. Is it to avoid the risk of the more numerous tropical predators ?

The Circumscribed Ecological Distribution of an Anopheline.

In the Rupununi savannahs generally, the wet season is marked by the seething abundance of an Anopheline mosquito, which bites very viciously at night in the open savannah. Specimens from the lower Takutu were determined as *Anopheles bachmani*, but it is by no means certain that this is the predominant species. Unfortunately my other material was destroyed. It is, however, certain that these extremely abundant savannah mosquitoes are exclusively *Anopheles*.

I was at once struck by the fact that whereas on the open savannah, throughout the night, these mosquitoes were intolerable, in several of the ranch houses, only twenty or thirty yards from these myriads, one could sleep without a net. I ascribed this at first to the fact that the houses usually stood on somewhat higher ground, and received more breeze, but the case which I analysed in detail was not subject to this explanation, and the real cause remains a mystery. The house in question was an Indian hut built actually in a low part of the savannah, not far from an aeta palm (*Mauritia flexuosa*) swamp. The house site was not raised in the least. For a considerable distance round the house-clearing grew a practically pure stand of a Malvaceous weed, *Sida* sp., passing gradually into grass (*Trachypogon*) savannah on the higher portions, and into swamp vegetation in the lower. On one side the house was separated from the savannah vegetation by carefully weeded, quite bare ground, some twenty-five to thirty yards wide. On the other side short swamp grasses and sedges reached the building. Mosquitoes were as good as absent in the house and on this bare ground, but one yard within the *Sida* beds they were present in veritable myriads, which not only bit everywhere fiercely, but entered eyes and nostrils in choking swarms. The Indian and his wife slept without mosquito nets, and we were not bitten during dinner, though we later used our mosquito nets as a matter of routine. Every night the cattle, to the number of fifty or more, congregated from the surrounding savannah ; and stood in a packed mass on the patch of bare ground, as near as they could crowd to the house. This, I thought, must be the key to our immunity—the cattle were diverting the mosquito attack from us (*zooprophylaxis*) as Humboldt first recorded on the Upper Orinoco (*see* Myers, 1932). But investigation with an electric torch proved this conclusion fallacious. The cattle stood contentedly chewing the cud, and so far as I could gather, were not being bitten at all. The only explanation which would apply to the ranches as well is that this *Anopheles* is very closely confined to the shelter of the herbage, and does not cross even a few yards of bare ground.

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The Ecological Distribution of Some Horse-flies (Tabanidæ).

The distribution of these flies is of economic interest on the savannahs of the Rupununi and the Rio Branco, where stock-raising is the only industry, horses the only means (save foot) of travel, and *mal de caderas* a devastating equine disease, said to be carried by these flies. I had ample opportunities of catching these insects on our carriers, our animals and ourselves, and I was interested to see how closely the different species were restricted to definite plant associations, using the latter term in its widest sense. On the open savannahs, far from forest, Tabanids are scarce, but in small enclosed savannahs, surrounded by forest, such as that of the bush islands and river fringes, huge *Tabanus* spp. (chiefly *T. importunus*) are frequently so abundant and persistent as to drive one's horses nearly crazy.

A detailed description of the plant communities listed below is in course of preparation for publication in an ecological journal.

(*a*) **Savannah Species.**

(1) *Coastal cane lands.—Tabanus cinerarius*, Wied. (Nickerie, Dutch Guiana) ; *Tabanus trilineatus*, Latr. (Nickerie, Dutch Guiana). Both biting a mule. This species is said to transmit *mal de caderas* in Marajo.

(2) *Wide savannah rivers* (*Uraricuera and Takutu*) 300–600 *feet elevation, with fringe forest of varying width.—Diachlorus* sp. (2) not in B.M. Abundant in boat, fiercely biting legs and feet. *Chrysops laeta*, F. Biting in boat. *Tabanus comitans*, Wied. On savannah bank (gap in fringe forest). Biting man.

(3) *Small isolated savannahs in semi-deciduous* (*monsoon*) *forest below* 1,000 *feet, Pakaraima Mts.—Esenbeckia prasiniventris*, Macq. Biting horses. *Tabanus comitans*, Wied. Biting horses. *Tabanus importunus*, Wied. Biting horses. This species is said to transmit *mal de caderas* in Marajò.

(4) *Upland savannahs, Mount Roraima and district.—Diachlorus* sp. not in B.M. Common, biting man (3,300, 6,600 feet). *Tabanus* sp. (3) not in B.M. Biting man (3,300, 6,600 feet).

(*b*) **Forest Species.**

(5) *Swamp forest, Orinoco Delta.—Tabanus* (?) *callosus*, Macq. Abundant, biting man. *Tabanus plangens*, Walk. Very abundant, biting man. *Lepidoselaga lepidota*, Wied. Frequent. Biting man.

(6) *Lowland mixed rain-forest.—Tabanus occidentalis, L.* (North-west district, B. Guiana). Frequent. *Diachlorus scutellatus*, Macq. (N.W. district). Abundant and persistent biter of man. *Chrysops costata*, Fab. (N.W. district). Biting man. *Tabanus albibarbis*, Wied. (N.W. district). Frequent, biting man. *Tabanus discifer*, Walk. (N.W. district). *Elaphella cervus*, Wied. (N.W. district). Frequent, biting man. *Tabanus leucaspis*, Wied. (N.W. district). Biting man. *Dichelacera marginata*, Macq. (Mojú, Para). Biting man. *Dichelacera damicornis*, F. (Berbice).

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(7) *Greenheart (Nectandra Rodiei, lowland rain-forest, Cattle Trail, British Guiana.—Tabanus aphanipterus,* Wied. Biting horse. *Dichelacera T-nigrum,* F. Biting legs.

(8) *Mixed rain-forest,* 1,000–2,000 *feet, Pakaraima Mountains.—Tabanus scutellatus,* Kröb. Abundant ; biting man. *Tabanus* sp. (1) not in B.M. Abundant ; biting man. *Tabanus* sp. (2) not in B.M. Biting man. *Erephopsis* sp. (1) not in B.M. *Erephopsis* sp. (2) not in B.M.

(9) *Rain-forest consisting of one species of profusely coppicing Leguminous tree* (probably a *Dicymbe*) 1,000–2,000 *feet, Pakaraima Mts.—Tabanus modestus,* Wied. Biting man.

(10) *Moist mixed rain-forest (in part cloud forest),* 2,000–3,000 feet, *Pakaraima Mountains.—Tabanus scutellatus,* Kr. b. *Tabanus* sp. (2) not in B.M. Biting man. *Erephopsis* sp. (1) not in B.M. Biting man. *Erephopsis* sp. (2) not in B.M. Abundant ; biting man. *Bolbodimyia bicolor,* Big. *Chrysops frazari,* Will. (This species occurs also in lowland mixed rain-forest in Trinidad) ; biting man. *Tabanus modestus,* Wied. Biting man.

(11) *" Asheroa " rain-forest,* 3,000 *feet, Pakaraima Mts.* (This consists of one species of very tall, strongly-buttressed tree with large, simple coriaceous leaves.)—*Chrysops molesta,* Wied. Biting man. *Erephopsis* sp. (1) not in B.M. Biting man. *Tabanus* sp. (2) not in B.M. Biting man.

(12) *Mixed rain-forest islands in upland savannah* 3,000–3,500 *feet, Roraima district.—Chrysops laeta,* F. Abundant in two localities, but followed us only a few yards into the open savannah. Biting man badly.

Periodicity in Tabanid Behaviour.

Other observers have remarked on the quite circumscribed biting hours of some Tabanid species. Most of those in the above list were annoying throughout the warmer part of the day, especially those which followed our canoes and bit the paddlers. The long-beaked ones, notably *Elaphella,* and the two *Erephopsis* species, bit only in the dusk, the former only at dawn, and the latter two at dawn and sunset. The rest of the day they were never seen. In the north-west district, where we were working with a gang of Indians in the same locality for an extended period, the succession of biters throughout the day was most marked. *Elaphella* invariably appeared just as the dawn was breaking, flew round the hammock nets and hanging clothes, inserted its long beak through the former, and was a painful annoyance at the bath, where it went especially and persistently for the buttocks. I never saw it after 7 a.m. The larger species of *Tabanus* were the chief biters up till about 10 a.m. They did not disappear then, but their numbers were greatly exceeded by the smaller species of *Tabanus,* which continued biting throughout the day until 5.30 p.m., reaching a maximum in abundance and annoyance about 3.30.

Colonisation of Virgin Country by the House-fly (Musca domestica).

Within the last few years the work of the Brazil-Venezuela-British Guiana Boundary Commission led to the rather frequent use, by surveyors and Indian porters, of two main routes to Roraima, which is the meeting-place of the three frontiers. In 1932 the writer used both routes, going by the British one, which led most of the way through mountain forest, along the left bank of the Ireng River to its head, and then along the border above the sources of the Mazaruni, and returning by the Venezuelan supply-route, across the Venezuelan and Brazilian savannahs to the Uraricuera River. Both paths are now disused, save by infrequent wandering Indians. The forest route was never more than a series of Indian paths, passable only by carriers in single file, but the Venezuelan trail, on the other hand, passing chiefly through open savannahs, was negotiable on horse-back, and was traversed by parties of Indian porters, sometimes as numerous as 350. The British employed far fewer Indians at any one time. In both cases the trails led through practically virgin country, but the Venezuelan route was about half as long (approximately 112 : 230 miles) as the other. In all of the ranch houses, both British and Brazilian, on the Rupununi-Rio Branco savannahs where both tracks began, the house-fly was present, and in several it was exceedingly abundant, breeding in pit-privies and practically covering the table at mealtimes. I was greatly interested by the fact that almost as soon as we left the savannahs to take the Ireng (forested) route, and entered the foothills of the Pakaraimas, house-flies ceased, and in none of the small settlements of the Patamona, Akawai and Serekong Indians,* whether in the forest or in upland savannahs, did we see a trace of this insect until we reached the Venezuelan Commission camp at Mount Roraima. There it was comparatively abundant, and we found it also in the Taulipang Indian villages along the savannah route to the Uraricuera. From one settlement to another it sometimes accompanied us the best part of a day, settling now and then on the men's loads of dried meat and other food. It was occasionally with us too when we had no meat. Thus along this line it had colonised the whole route to Roraima in spite of the fact that the prevailing strong savannah winds (N.E.) would be against it, whereas on the British side the forest, although offering shelter, had apparently proved an insuperable difficulty from the outset. How much the occasional horse and bullock traffic on the savannah route had helped, it would be difficult to say.

Curiously enough this case was exactly paralleled by that avian house-fly, the black vulture (*Catharista atrata*). This species, in contrast to the turkey buzzards (*Cathartes* spp.) and the King vulture (*Gypagus papa*), is very much a lover of settled and even urban districts. I never saw it, however, in the settlements of the forest Indians, and it disappeared from the British (forested) route to Roraima, ten miles before the house-fly, before in fact we actually entered

* It was not uncommon in the Macusi settlement, on the small Kurasabai savannah, about ten miles within the foothills, by a largely savannah route. Thereafter we entered forest and saw it no more.

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the Pakaraima foot hills. In contrast, on the savannah trail, it was present for at least half the distance from the Uraricuera to Roraima.

Observations on Miscellaneous Insects.

Facultative Bloodsucking by Phytophagous Hemiptera.—In 1929, I published collected records on this subject. Mr. Pickles, at Santarem, on the Amazon, added another when he gave me for identification a small green leafhopper of the Cicadellid genus, *Parabolocratus*, which bit his arm, under the electric light. At Manaos a small Anthocorid bug, not yet named, and of unknown normal feeding habits, settled very quietly on my wrist, under electric light, leisurely dug in its rostral setæ, and began to suck blood. There was a steady yet sharp sting, but no mark nor irritation next day.

Platypodids as Human Parasites.—In January, at a small camp in heavy lowland rain-forest, at the foot of the Kanuku range, one evening at dusk, before we lit the lamp, countless swarms of a tiny platypodid beetle suddenly settled on our persons, where many penetrated beneath the clothes. I was kept awake during the night by their incessant tickling; nor was this the worst, for when pressed by hand or tightness of clothes they caused, either by biting or secretion, a small swelling, which first burned and then itched nearly as long and badly as bête rouge (*Trombicula*).

Mosquitoes Attracted by Blue Colour.—The town of New Amsterdam (B. Guiana) is noted for almost intolerable swarms of biting mosquitoes (*Aedes taeniorhynchus*, testé L. D. Cleare) which breed in the mangrove flats of the Berbice river. On January 30th, three of us were walking along the river front, accompanied by the usual cloud of mosquitoes. One of us wore a navy-blue raincoat, another a pale-green dress, while I had a whitish cotton-crash suit. On the backs of the latter and of the green dress there were settled three mosquitoes each. In very striking contrast, the blue raincoat bore a continuous thick grey felt of mosquitoes.

Sarcophaga sp. *Developing on a Minimum Diet.*—In the Orinoco Delta I had blown two fresh eggs of a finch (*Saltator* sp.), washed them well, and left them to drain during the night and packed them in the morning, as they seemed dry. When I unpacked them from a tight tin container a month later I found that seventeen well-developed flies (*Sarcophaga* sp.), about the size of the house-fly, had emerged, evidently from larvæ deposited while the eggs were draining. The eggs were unspoiled, and the only food the maggots could have had was the inner membrane and trace of egg albumen after the washing.

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INCREASING BREEDING EFFICIENCY ON STUD FARMS THROUGH PREGNANCY DIAGNOSIS.

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THE following paper will record work done in the first eight months of this year on the diagnosis of pregnancy in Arabian and other horses at the Kellogg Institute, with observations on the practical value accruing from tests of this kind, to the end that similar tests may be seriously considered for adoption at other stables where intensive breeding with valuable horses is being carried on. These tests have been made here as a pure routine, and form part of a research programme that has been instituted in connection with the Arabian stables. The theoretical basis of the test, namely, the appearance of a gonad stimulating hormone in the blood stream of the pregnant mare, has been the object of a considerable number of researches during the past four years, following its discovery in 1930 by Cole and Hart,[1] and by Zondek.[2] The practical value of the test was stressed by Hart and Cole,[3] and the growing appreciation of the existence of such a test, and the part it may play in future in breeding programmes, is shown by the recent editorial comments of Cromwell[4] on work being carried out by Dean, Young and Wall, of the U.S. Remount Depôt, Front Royal, Va., and also by the report of Nye.[5] The main details of the pregnancy test have been adequately dealt with in the paper of Hart and Cole, cited above. Gonad stimulating hormone appears in the blood of the mare between the thirty-ninth and forty-second day after a breeding that results in conception. From theoretical considerations advanced in the detailed study of Catchpole and Lyons,[6] it is unlikely that success will reward any attempt to detect this particular hormone at any earlier period of time. The hormone is recognised by its action on the genital tract of the immature rat. A word of warning may be timely on the use of the rabbit in diagnosis of pregnancy in mares. Although in other ways this is feasible, the rabbit is some twenty-five times less sensitive than the rat (Cole, private communication), and small concentrations of hormone might be overlooked, especially in early stages after the forty-second day, by the use of this test animal. In regard to the accuracy of the test, the figures of Cole and Hart, of the European workers Glud, *et al.*,[7] and of Catchpole and Lyons, indicate close to 100 per cent. accuracy when carried out between the forty-second and, say, the one-hundredth day, and it seems hardly likely that further accumulation of results will dispute this figure. We have, therefore, for the mare, an established pregnancy test that is even more precise than the widely used Aschheim-Zondek test for human pregnancy, in which pathological conditions lower the percentage accuracy. After the fourth month, the particular hormone with which we are here concerned disappears from the circulation, and a second hormone, œstrin,

* This work was carried out at the W. K. Kellogg Institute of Animal Husbandry, Pomona, California.

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begins to increase in quantity, principally in the urine. The fact of pregnancy in the mare can be established by the detection of this hormone also, but in the early stages with which we are concerned the amounts of œstrin present are too small to ensure any degree of reliability in the test.

As compared with most other domestic animals, the mare is notoriously infertile (Orr and Darling[9]). Hammond and Marshall[11] state unequivocally that the birth-rate in horses is " phenomenally low," the average annual sterility being between 40 and 50 per cent. After a mare has been bred from, it is common practice to try it again after a period of eighteen to twenty-one days, and also after a second similar interval. If the mare evidences no signs of heat on these occasions, it seems customary to regard it as being in foal, thereafter depending on rather casual observation in case further signs of heat should show up. The routine of pregnancy diagnosis calls for the testing of the blood of the mare at just this second trying period, namely, the forty-second to forty-fifth day, when a positive statement can now be made as to the condition of the mare. Two immediate advantages of this knowledge will be apparent : mares in-foal are released from subsequent undesirable teasing, and from further observation ; mares that are not in foal can be more intensively watched for signs of heat. An interesting result is apparent from our figures tabulated below. In spite of teasing at the third and sixth weeks, 30 per cent. of mares, actually not in foal, nevertheless fail to show signs of heat. The teasing of mares at regular intervals of time after service is an uncertain procedure, since the time of next appearance of heat will depend much on the duration of the heat period (Hammond). Moreover, service records extending over a limited period show in a surprisingly high percentage of mares that the interval between an unsuccessful breeding time and the next observed date of coming into heat may be very prolonged. In a list of twenty-five mares taken over two years, 50 per cent. showed such intervals, extending from four till ten months, the majority being towards the higher figure. This feature in itself would tend towards a high incidence of sterility. Mares may begin the season with regular cycles, and later run into these prolonged periods, during which it might easily be believed that the mare is in foal. It seems doubtful if this apparent absence of heat can be entirely attributed to defective observation of signs of heat, in fact we know that in some cases this is not so. It is more likely that a pseudo-pregnant period, conditioned by the formation of a corpus luteum, may supervene in the mare as in some other species. Possible termination of such periods by suitable treatment is discussed below. In initiating such treatment, it is evident that pregnancy diagnosis previously performed is essential.

The practical bearing of the above figures is obvious. Since 30 per cent. of mares go along without being bred from for at least six weeks, and often very much longer, it becomes desirable for efficient practice to know *which* are the mares that are *not* in foal. The pregnancy test supplies the answer.

Experimental Methods and Results.—Mares are bled routinely at the forty-

second to the forty-fifth day. Since injections are made on Fridays each week, it is convenient to leave all the bleedings for a week till the Thursday afternoon, taking then samples from all mares that have passed the forty-second day during the previous seven days. We find it most convenient to place a few crystals of sodium citrate in a 100 c.c. flask, and to withdraw about 50c.c. blood. After shaking, the blood is allowed to stand for an hour or so, when the red cells are found to have collected at the bottom of the flask, and the clear supernatant plasma can be poured off, to be used in the test. The test animals are twenty-two to twenty-four days' old female rats. They arrive Fridays, and injections are made the same evening. Two c.c. of mare plasma are injected into each of three rats in a single injection. There is no need to administer a divided dose on successive days, as with many of the hormones. If the mare from which sample is taken is in foal, hormone will have appeared in its blood, and this will act on the genital tract of the rat. On Monday or Tuesday following, the rats of each group are examined for vaginal opening ; this, as soon as it is observed, is a first positive indication that the mare is in foal. In case, however, that the reaction is of low intensity, an autopsy of all animals is made on the fifth day following injection, and the ovaries, the focus of the reaction, examined. If the ovaries are still infantile, the corresponding mare is diagnosed as " not in foal." If a reaction has occurred, shown by increase in size often to many times that of the control, and always the production of enlarged clear follicles, and opaque, reddish-yellow luteal bodies, then the mare from which this serum derived is diagnosed as " in foal." Owing to the rapidity with which hormone is produced, once it has begun to appear, samples taken even only a day or so after the forty-second day are almost invariably found to be quite active, and may be diagnosed from vaginal opening in the rats as early as the third day after injection. It is only to confirm negative reations that autopsy is delayed till the fifth day.

Table I summarises the results obtained :

TABLE I.

(1) Mares diagnosed as pregnant at first time of testing	30
(2) Mares diagnosed as non-pregnant at first time of testing	14
(3) Mares of group 2 that were bred again following the test, and were subsequently shown by the pregnancy test to be in foal. These mares are *not* included in the figures in group 1	6

The mares of the first group need little comment. Following one or more breedings at intervals of eighteen to twenty-one days, they were diagnosed as in foal at the first time of testing at forty-two to forty-five days. They were then released to pasture, or to their owners, without further consideration. Of the fourteen horses in the second group, nine have since been rebred (that is, following the first negative diagnosis), and of these, six subsequently proved by the use of the pregnancy test to be now in foal. Two others have since been observed in heat, but for various reasons have not been rebred. The remaining

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three mares have not yet been observed in heat. Not included in the table are a number of tests made with draught mares, a group of which, bred to a single young stud horse that had not been previously used, all proved to be non-pregnant. It would appear that here we have a good indication that the stud horse was at fault; the pregnancy test further suggests itself as a means for obtaining an early estimate of the foal-getting capacity of a new stallion. Out of twenty-four brood Arab mares owned by the institute at the beginning of the current year, twenty-one are now in foal (87 per cent.) Of the remaining three, two are excellent brood mares that we have every reason to hope will be obtained with foal at an early date; the remaining mare is a young nullipara, with a tendency to nymphomania, that has been repeatedly bred, but not yet obtained in foal. The percentage of mares in foal recorded above is in itself a striking testimonial to the value of the test. But the advantages of such a test to an institute of this kind, that not only maintains a considerable Arabian stud of its own, but also receives a large number of outside mares to be bred, go further than this. A positive diagnosis abolishes all necessity of further watching or testing; a negative test allows of closer watching, and the probability that sooner, rather than later, the animal may be rebred. The number of foals to be expected in the following season is positively known. Animals that are left at the ranch, to be boarded until bred, may be returned to their owners before the end of the seventh week after a successful breeding. Hitherto their stay might be unduly prolonged, in order to avoid disappointment; now the owner has the satisfaction of knowing that the mare will not have to be returned at some later date for re-breeding.

Having thus experienced the immediate practical value of the test, it remains to suggest how a plan of pregnancy diagnosis could be extended to other large breeding establishments where valuable horses are involved. The desideratum appears to be an agricultural, veterinary or biological laboratory in the vicinity where samples may be submitted for assay. Samples may be sent through the mails, where the time of transit is only a day or so, without danger of losing their activity (they may be stored indefinitely under refrigeration). With some knowledge of the number of samples to be submitted each week, the problem of budgeting for test animals should not prove too difficult, and the cost in any case of making the test will only amount to a fraction of the stud fee.

Pregnancy testing should appeal to both breeder and owner. On the one hand, studs, as well as mares, are saved from prolonged teasings; on the other hand, the value of a mare may be very distinctly enhanced if it be definitely determined that she is with foal by a valuable sire. A breeding programme may be carried out with the element of doubt largely removed, and the percentage of brood mares barren in any one year greatly decreased. On those farms where early foals are essential, the test may mean the difference between success and failure. In any case the test cannot fail to lead to a greater efficiency in the management of the stud horse, and of mares to be bred.

Some Experiments with the Gonadotropic Hormone of Mare Serum.

The effect of pregnant mare serum on the genital tract of small laboratory animals suggests that, in larger quantities, it might have positive effects on the reproductive apparatus of the larger domestic animals. In fact, a considerable amount of work has already been one in this regard by Cole and Millar[8] on the ewe, in which it has been shown that ovulation can be induced in an œstrum by the use of this hormone. The causes of absence of conception in the mare are manifold, as reference to Orr and Darling's summary[9] will show. In the absence of manifestations of heat, it is possible to infer, in the first instance, an ovarial deficiency, due possibly to an inhibition of follicular growth, and of ovulation by corpus luteum remnants. The injection of gonad stimulating hormone might restore the cycle. In this connection it will be interesting to see if the refractory period following breeding in many mares, in absence of pregnancy referred to above, can be regularly terminated, as apparently occurred in both the mares described below. It is, of course, impossible to predict how these mares would have acted in absence of treatment, and only a larger series, such as we hope to accumulate in time, would lend substance to any theory ; however, the records of the two mares below seem worthy of mention, quite apart from the therapeutic treatment. They illustrate a number of points that have been made in the test, and also indicate the rôle of pregnancy diagnosis instituted in January, 1934. The mare serums used were withdrawn from mares at the time when the gonadotropic hormone content of the blood is very high (*see* Cole and Hart[1] for details). These serums contained 100 rat units (Cole [10]) per 1 c.c. The amounts administergd, in absence of precedents, were arbitrary.

Leila, A. H. C., No. 275.*—March 4th, 1927, foaled ; March 8th, 1932, foaled ; March 17th, 1932, bred ; July 22nd, 1932, bred ; March 4th, 1933, bred ; October 10th, 1933, bred ; January 17th, 1934, diagnosed " not in foal " ; January 19th, 1934, injected subcutaneously with 1,000 rat units mare serum hormone ; January 23rd, 1934, came into heat and bred ; February 15th, 1934, came into heat and bred ; April 5th, 1934, diagnosed " in foal."

Ferda, A. H. C., No. 596.*—Foaled every year, 1927–1931. June 19th, 1932, foaled ; June 28th, 1932, bred ; February 28th, 1933, bred ; March 29th, 1933 ; bred ; April 18th, 1933, bred ; May 7th, 1933, bred ; January 3rd, 1934, bred ; March 21st, 1934, diagnosed " not in foal " ; April 18th, 1934, injected subcutaneously with 2,000 rat units or mare serum hormone ; April 26th, 1934, came into heat and bred ; June 20th, 1934, diagnosed " in foal."

Further experiments along this line will be done as opportunity arises.

The author wishes to express his thanks to Professor G. H. Hart, University of California, and to Dr. J. Hammond, F.R.S., University of Cambridge, for advice and criticism.

* Registered with the Arabian Horse Club of America.

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NASAL AND BRONCHIAL CATARRH.

By W. M. SCOTT, F.R.C.V.S., Dr. Med. Vy. (Zur.),

Bridgwater.

MR. G. MAYALL, in the November issue of THE VETERINARY JOURNAL, has painted an interesting and informative clinical picture of the common catarrhs affecting the horse, dog and cat; suggesting at the same time various lines of treatment. To carry this subject a little further and reveal light where perhaps darkness is, it may be opportune to look upon the subject from a pathological and immunological angle.

First, then, the common infections. Colds in animals, in my opinion, are caused by an ultra-microscopic virus which accounts largely for their infectivity, and if the bacterial onslaught would stop there the infection would run its course in a few days without the development of gross pathological lesions. Unfortunately, however, in the upper respiratory mucosæ there is "housed" a variety of *saprophytic* bacteria ready to become *parasitic* on the first favourable opportunity. Depression—systemic and local mucosæ—is the root cause. If the catarrh is specific the ultra-microscopic virus is the forerunner; if non-specific, a variety of causes may be at work: exposure, under or improper feeding, overwork, systemic debility, air laden with foul gases such as is found in badly ventilated and badly drained stables, etc. But a non-specific catarrh, if a number of animals are housed together, may take on highly infective proportions, this being due to the fact that the organism gains in virulence as it passes from animal to

animal, especially if such animals show a low opsonic index, or, in other words, a low natural power of resistance. For example, the streptococcus in the first case may be very lowly virulent, but by the time it passes through a number of horses its ascendancy has become pronounced, perhaps even to the hæmolytic type.

Having said this much, it might be well to look into the local action and reactions of the mucosæ following upon bacterial aggression, and see if thereby a logical line of treatment reveals itself. No sooner the saprophyte become a parasite than rapid reproduction takes place, the natural secretions of the mucous membrane are reduced or even stopped, the superficial epithelial cells are destroyed by the bacteria and their toxins, proliferation and destruction of those cells goes on, leucocytes hasten to the area (active congestion); the mucous membrane is now swollen and inflamed; intense phagocytosis by the leucocytes and epithelial cells goes on, and sometimes these are in the ascendant, sometimes the bacteria. This see-saw warfare culminates in the production of catarrhal nasal discharge, the contents of which are really, of course, dead and dying bacteria, body cells, and mucous and serous effusion.

At this stage there may be a slight irritative fever due to the local condition, but it may extend, in which case absorption of toxins—toxæmia—has taken place. Antitoxins are developed in the body fluid to counteract the auto-intoxication, and recovery usually follows. But in some cases the aggressive bacteria break through and are carried into the blood or lymph stream; these may settle in a lymph gland, or the parenchyma of an organ: lungs (pneumonia), kidney (nephritis), etc. When extensive destruction of the mucous membrane takes place the underlying structures may be involved, when a chronic catarrh—nasal gleet—is set up, and even necrosis of the prolongation of the turbinated bones may develop.

Now one word in regard to the nasal discharge. I fear the present-day practitioner is far behind his old-time *confrère* in interpreting the signs and portents of purulent discharges, no matter whether they come from a nasal or other cavity, or an infective wound. Most of us to-day look upon all pus as a pathological entity pure and simple; the old practitioners divided pus into two kinds: "laudable" and unhealthy—and it would well repay the clinician of to-day to do likewise. "Laudable" pus is rich in pus cells, dead and dying bacteria, serous effusion; it is thick, straw-coloured and tenacious, as can be proved by squeezing it between the finger and thumb and drawing them apart, when an adhesive band will form. Unhealthy pus is saneous, watery, dirty-grey in colour, and non-adhesive. "Laudable" pus to the immunologist indicates that nature has put, or is putting, up a bold fight against bacterial aggression, *positive chemotaxis* is in evidence, and the protective body forces are in the ascendant; while, on the contrary, unhealthy pus, or *negative chemotaxis*, has taken place, the immune bodies are thwarted, bacterial aggressivity is in the ascendant, and in this state at any moment they may run riot, ending in septic infection, a serious condition.

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So much for what one might call the academical side of nasal catarrh ; and the question may be asked : from the foregoing deductions can we build up a logical or more logical line of treatment than is carried out in general, or is suggested by Mr. Mayall in particular, in his article ? We may at once be candid and admit a nasal catarrh, once established, cannot be cut short—this is a *sine qua non* ; and let us also be honest and agree that if it were not for the *vis medicatrix naturæ*, man's efforts would be futile. It comes, therefore, to this : all the practitioner can do is to assist nature, and the most successful clinician is he who studies this unwritten law. In passing, I should like to see students taught more of the fallibility of drugs, and less of their infallibility. I am sure it would save them from much disillusionment in after life. During the time the warfare is going on between the body cells of the mucosæ, on the one hand, and the bacteria, on the other, the general vital forces of the patient should be sustained by food rich in the essential vitamins ; and that the blood may be properly oxydised pure air is essential.

The eliminative organs should be activated to free the system from effete material and toxins, if present, by giving laxatives, diuretics, diaphoretics—the simpler the better—with abundance of cold water. Unless complications set in, or the case hangs fire, I rely on full doses of sod. cit. and sod. chlor.; and the most useful of these is the former, for primarily it is a decalcifying agent. Further, these two drugs—normal saline solution strength—are my sheet-anchor for nasal irrigation.

I notice Mr. Mayall recommends medicated inhalation ; but save for a slight soothing of an inflamed mucous membrane its therapeutical value is *nil*. So, too, he advocates the insufflation of antiseptic powders and the injection of antiseptic solutions, presumably with the view to bacterial destruction. Now, how can this be ? If these applications were successful in bringing about bacterial destruction, they, too, would destroy the phagocytic cells, a force we not only want to conserve, but stimulate. Fortunately, these dressings do neither, hence their use is almost futile, if harmless. An antiseptic applied to an inflamed discharging mucous membrane can only reach the superficial elements—the content of which, being " cast-offs," counts but little. The warfare which is taking place is deeply embedded in the mucosæ : this is the front-line trench, and is well " housed " and out of the reach of any antiseptic dressing. Reasoning thus, I have long ago given up nasal antiseptics, so-called, as being antagonistic to nature, and in their stead use the citrate and chloride of sodium solution.

Where a membrane is deeply inflamed, an active congestion and consequent stasis takes place in the capillary blood vessels : that means that phagocytosis is handicapped, which in turn facilitates bacterial ascendancy. The use of citrate of soda, acting as it does as a decalcifying and osmotic agent, facilitates the pouring out of serum, and this serum, being rich in opsonins, prepares the bacteria for the leucocytic feast, the consequence being an increased purulent discharge ; and the clinician's aim in those cases is an abundant flow of " laudable " pus. If the

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natural immunising mechanism of the animal body is low, and the tissues do not respond to the bacterial stimulus, *passive* immunisation—serum therapy—is indicated, or, if the patient is strong enough, *active* immunisation—vaccine therapy—is called for ; but this is too large a subject to be entered into here.

SHEEP SCAB.

By EDWARD MORGAN, F.R.C.V.S., D.V.S.M.
Valencia, Venezuela.

THESE few notes are not written with the least intention of describing this too well-known skin disease of sheep, but, on the other hand, are written from a practical sheep farmer's point of view.

Ever since I was a boy tending our flock on an extensive sheep farm in Cardiganshire this disease has been lurking in certain areas of England and Wales, and has been concealed, much to the annoyance of the average flockmaster, by ignorant owners and their shepherds, who often dread the presence of a police officer on their premises. Furthermore, they detest reporting a suspected case during the winter months for fear of being compelled to dip the whole flock, particularly so when their ewes are heavy in lamb ; also during the marketing season for mountain sheep, from August to the end of October, which often coincides with the dipping period in the districts which I have in mind. Any farmer who wishes to evade the law takes great care that any sheep with unmistakable symptoms of scab do not appear near the dipping station, but are often left far away on the misty hills where very few people, except the shepherds themselves, can find their way. The farmer later on takes his apparently healthy sheep to the market, his flock having already been legally declared by the local police inspector as one of those properly dipped. A farmer, perhaps from another county, buys the sheep, and may be quite pleased with his bargan until one day he, or perhaps his neighbour, observes that instead of a nice level coat of wool one or more members of the flock has a few specks of wool raised above the rest of the coat, as if birds had been pecking at it, which they sometimes do during the nesting period. The raised patches are at first white, but soon the colour changes and corresponds to the colour of the surrounding soil, when the animals get busy with both hoofs and teeth, endeavouring to allay the irritation. Fortunately, the farmer who buys these mountain sheep, in the majority of cases, is a lowland farmer, and immediately reports the suspected outbreak to the local authority. The latter, after having the case confirmed by a veterinary inspector, complies with the " sheep scab " order, and orders these sheep, as well as in-contact sheep, to be dipped and isolated. He generally traces the origin of this outbreak to the district where they had been bought, and thus the culprit is discovered after having his flock examined, etc.

The best means to discover Highland flockmasters who are in the habit of evading the law in the above fashion, is to appoint patrolling shepherds, *i.e.*, to

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appoint only experienced and conscientious men, each of them knowing every corner of the mountain range to be patrolled, whether it is Plinlimmon and Snowdon peaks, or the Pennine Range, etc., and could find their way in the thickest of mist, as a sea captain knows his way in the thickest of fogs. Furthermore, not only knowing their way on the hills, but also the shepherds' secret places. Until my native county of Cardiganshire appointed a well-known shepherd who had previously spent the best part of his time as a shepherd on the Cardiganshire hills, sheep scab was as prevalent there as foot-and-mouth disease was recently in the Argentine, in spite of reports being to the contrary *re* the last-named disease. This patrolling shepherd reports to the local authority, being appointed by the County Council; also, during the rounding of sheep for dipping, visits the dipping station yards in the morning when all the sheep in that particular section are supposed to have been rounded. After keenly glancing at the sheep, he then visits the places where these sheep had been collected, *i.e.*, the grazing grounds. I have known of cases in Cardiganshire where the patrolling shepherd on these occasions has found even scabby sheep left behind purposely, with the result that heavy fines were inflicted. This has been the means of cleaning the lurking-places of sheep scab on the Cardiganshire hills. Unfortunately all neighbouring counties are not so keen as Cardiganshire in stamping out sheep scab, and refuse to appoint patrolling shepherds. Mountain sheep wander for miles and often cross the county boundary, and may bring fresh cases of scab into the county. If all counties would appoint conscientious and experienced shepherds to patrol each county we would soon eradicate sheep scab from the island.

Even at some of the dipping stations the methods are crude. I know of one particular centre where thousands of sheep are being dipped every year where the tank is almost half-full of peat, and the strength of the dipping solution is only calculated by guesswork. A police officer may or may not be present.

Here is an extract, concerning this particular question of lack of attention to the most important part in connection with curing sheep scab, from the *Cardiff Western Mail* for Spetember 19th, 1934: "Criticism of the methods adopted by certain farmers in Breconshire when sheep dipping was made, by the Chairman of the County Diseases of Animals Committee (Mr. J.W. Jones), at Brecon, on Tuesday. Mr. Jones said he had been given to understand that several farmers in the county neglected to change their dipping-tubs. He had received information, he said, that farmers were dipping as many as 5,000 sheep in the same tub continuously, adding dip and water.

"Mr. J. W. Williams (Sennybridge): 'I have known farmers who have not cleaned out their tubs for six months. Some of these are in an abominable state. It is up to our inspectors to see that these conditions do not continue.'

"The Chief Constable (Colonel C. G. Cole Hamilton) agreed that if the conditions were as stated, the baths were bound to get in a very bad condition. The matter was then dropped, but several members expressed the hope that matters would be improved by the more frequent visits of the inspectors."

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The above is only one instance of many. I consider such methods as the best means of spreading sheep scab.

If the farmers of each county would join unanimously in the first place and say that they are not going to let anything prevent them from eradicating sheep scab, and that they are anxious to co-operate with the officials, then sheep scab could easily be eradicated from Great Britain. Should it be impossible to get unity, other steps should be adopted, such as we have already mentioned, of compelling each county to appoint patrolling shepherds at a salary that would encourage them to take interest in the work. These should report regularly on the different areas they visit.

When we think of a vast country like Australia having eradicated this terrible pest from their flocks, surely there can be no satisfactory excuse for the flockmasters of Great Britain, with every facility at hand, for not taking a leaf out of Australia's wonderful and envious book. To say that it is impossible to eradicate sheep scab would almost sound incredible in a country which is the envy of all stock-raising countries for its excellent stock ; yet a curable skin disease is allowed to stay amongst the flocks, much to the detriment of up-to-date flockmasters, and often handicaps foreign trade, without mentioning home trade. What hopes have we of seeing our herds free of tuberculosis when such a simple curable disease as sheep scab cannot be eradicated from the flocks? Yet huge sums of money are spent annually in trying to control the disease, but not eradicating it. Apart from curing sheep scab, the dipping is beneficial to the animals, if only to destroy other parasites such as sheep ked, and to a certain extent as a preventive against maggots, if the proper dipping material is used. I had once a small flock of sheep under my charge in Venezuela, and the only means I could get to make these sheep thrive was by dipping them every fortnight throughout the year in an arsenical dip of Coopers, called " Garrap aticida." When I handed the flock over to another man who did not agree with dipping, they all died in a few months' time.

FIELD OBSERVATIONS ON WEATHER STAIN AND BLOWFLY STRIKE OF SHEEP, WITH SPECIAL REFERENCE TO BODY STRIKE.*

By F. E. HOLDAWAY, Ph.D. (Division of Economic Entomology) and C. R. MULHEARN, B.V.Sc. (Division of Economic Entomology).

Summary.

FLY attack of sheep usually occurs in the breech, on the prepuce, on the head, or on wounds. Field observations in New South Wales have demonstrated that bacterial conditions of wool known collectively as " weather stain," may be the forerunner of fly attack in the wool on other parts of the body. The predisposing environmental conditions were in this case excessive rains and humid conditions

* Summary from a Paper in the Report of the Council for Scientific and Industrial Research, Melbourne, Australia.

generally, which resulted in the wool being kept wet for long periods. The presence of stain and strike in the wool made possible observations on the predisposing conditions contributed by the sheep.

Most of the stain and strikes occurred along the back of the sheep. Quantitative data obtained from 12,859 sheep in different parts of the State showed that many variable factors were concerned in the production of strike, and yielded the following information :

(1) The wither was more susceptible to stain and strike than the loin. (2) In general, sheep with yellow wool yolk were more susceptible to both stain and strike than sheep with lighter-coloured yolk. (3) In stained sheep, when comparable regions were compared, wither with wither and loin with loin, unstained regions showed a lighter yolk colour than stained regions. (4) When yolk colour was expressed as a numerical value, there was a relation between the mean yolk colour of a flock and the percentage of the flock stained. This relation holds when the flocks considered have been submitted to fairly similar weather conditions, the relation being best seen when all the flocks examined in each district are studied together. (5) In the pure-bred Merinos, the amount of stain increased with the density of the wool, the percentage of stained sheep in the slack-, medium- and dense-woolled groups being 44 per cent., 68 per cent. and 83 per cent. respectively. In the impure Merinos, the differences were not significant. (6) Data on the relation between wool density and body strike were insufficient to show statistically significant differences, but suggested that in the pure Merinos there was more strike in the dense-woolled sheep than in the medium-woolled sheep, and in these latter more strike than in the slack wools.

Evidence is advanced in favour of considering yellow yolk to be identical with " golden coloration" of Rimington and Stewart, and therefore of considering the intensity of the yolk colour as being an indicator of the proportion of sweat in the wool yolk. High sweat concentration is therefore considered to be a factor contributed by the sheep in predisposing to strike. Other evidence supporting this contention is cited. Wool density as a factor in susceptibility is shown to be related to sweat concentration.

A study of the relation between susceptibility to weather stain and body strike and susceptibility to crutch strike suggests : (1) That amongst sheep susceptible to body strike there may be a higher percentage of sheep which would be regarded as C class according to the classification of Seddon, Belschner, and Mulhearn. (2) That body-struck sheep are more susceptible to crutch strike than are unstained sheep.

OBSERVATIONS UPON NEURITIS IN FOWLS (So-called Fowl Paralysis) : A Quick Method of Diagnosis by Means of Nerve Smear Preparations.

By K. D. DOWNHAM and C. CROMPTON,

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In the course of routine examinations in the laboratory we have found in most cases of neuritis or so-called fowl paralysis that parts of the nervous system exhibit infiltration with cellular elements of a leucocytic type. In some outbreaks of disease in which symptoms of paralysis are exhibited the lymphocytic type of cell predominates, whilst in others eosinophil myelocytes are the chief cells responsible for the condition, and in certain cases plasma cells predominate. The frequency with which neoplasms, particularly lymphomata, occur in flocks where the paralysis is due to infiltration of the nervous system with cells of a lymphocytic type is worthy of note. The mode of entrance of these cellular elements into the nervous system appears to be either by the blood stream or by means of the lymphatic system. The possibility of bacterial poisons arising from an infective focus such as the epithelial lining of the intestines damaged by the ravages of parasites, particularly coccidia, travelling along the perineurial sheaths and bringing about a tissue response characterised by the localisation of a leucocytic infiltration, is worth consideration.

It is our opinion that internal parasitism plays an important part in the causation of neuritis, with paralysis as a symptom, and that most of the outbreaks met with in this area are the result of such an infestation either directly or indirectly. This conclusion has been arrived at because it is rare for us to see cases of cellular infiltrations of the nervous system without manifestations of enteritis due to past or present parasitism, and also from a knowledge of the conditions existent upon most poultry farms.

From our observations we are, at present, of the opinion that the several causes of neuritis in the fowl are as follows: (*a*) The result of a lymphocytic infiltration of the nervous system following parasitism ; (*b*) the result of leucocytic, other than lymphocytic, infiltration of the nervous system following parasitism ; (*c*) invasion of the nervous system and other tissues of the body with neoplasmic elements of either lymphomata or round-celled sarcomata ; (*d*) polyneuritis due to the lack of essential factors in the diet ; (*e*) neuritis associated with visceral gout. It is likely that the causal agent, which may be a toxin or virus, which brings about paralysis, enters the blood stream through the damaged mucous membrane of the alimentary canal and induces an increased production of leucocytes, which having gained entrance to the nervous system by the nutrient blood vessels, are unable to escape by reason of their numbers, and the nerves become blocked, producing the characteristic infiltration. The hyperplasia of this type of cell in other tissues may lead to the production of tumour formation.

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Neuritis may occur at the age of a few weeks, but it is more common at the time when the bird comes into production. This coincides directly with the age incidence of the two most common types of coccidiosis, *i.e.*, cæcal and duodenal, which affect poultry, and it is significant that the duodenal type is now very widespread. This circumstantial evidence supports our contention that there is a definite association between intestinal parasitism and so-called fowl paralysis. We recognise the fact that there appears to be a tendency in certain strains of fowls to manifest these nerve symptoms ; this may be explained by the fact that hereditary tendencies are passed on from the parent stock to their progeny in several of the conditions which we consider to be the primary cause of neuritis: namely, faulty conditions of rearing and management which are conducive to parasitism, deficiency factors in the diet of the parents, and visceral gout. Owing to the existence of parasitism in the parent stock, many chicks are hatched with hereditary tendencies to produce large numbers of leucocytes in response to intestinal irritation ; whereas chicks from parent stock which has not suffered from parasitism do not possess this tendency. In our opinion the possibility of a specific virus being the cause of neuritis in certain cases cannot be disregarded, but we believe that the bulk of the paralysis in birds is brought about by parasitism.

Where outbreaks of disease occur and paralysis is a typical symptom, it is usual for laboratory workers to examine the nervous system by means of histological preparations. The standard methods adopted by most laboratories in the diagnosis of cellular infiltrations of the nervous system are not entirely satisfactory, on account of the length of time necessary to prepare sections for examination and the modification of the cellular elements brought about by methods of fixing. It was thought advisable, therefore, to devise a means by which this difficulty could be overcome, and a method first applied by one of us (C. C.) has recently been employed which we consider to be simpler and more satisfactory than the generally accepted methods.

A portion of the nerve which is to be examined is carefully dissected away and cut across in two places by means of a sharp scalpel. If it is thought necessary, owing to the presence of blood, to wash in normal saline solution, a fresh surface should be cut before making the preparation. The cut surface is smeared on a slide, gentle pressure being exerted on the nerve by means of pincer forceps. The preparation is then stained by Leishmann's method and examined. The infiltrating cells which have been exuded from the nerve sheaths show up excellently, and a diagnosis may be given at once. It is unusual to find more than one or two red cells present among the large number of infiltrated leucocytes, even if no special precautions are taken in the preparation of the smear.

We are of the opinion that there is an unnecessary amount of alarm centring round the subject of fowl paralysis, and feel it would be better if a great deal more thought were given to the conditions upon poultry farms, which in our opinion are responsible for its incidence. The value of folding units for rearing purposes

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up to twelve months of age appeals to us, because by this method of rearing it is possible to overcome parasitism, and the mortality upon farms when folding units are used is found to be surprisingly low.

In our opinion neuritis or fowl paralysis is the result of the rapid growth of poultry farming, and there are few farms which may not occasionally show signs of the disease ; but it is as well to remember that epidemics with a high mortality are by no means always the sequel to the finding of cellular elements in the nervous tissue. The lesson to be learned from the increasing prevalence of this disease is that all is not right with the methods that are employed in the breeding, rearing and management of poultry, and that there should be a great deal more co-operation between poultry owners and veterinary workers engaged in poultry disease control.

Clinical Articles

Clinical Notes from East Anglia.

By CAPT. J. C. TAYLOR, M.R.C.V.S.
Beccles.

Wound in Cow's Udder.

History.—At 5.20 a.m., on September 24th, 1934, I received a telephone call for urgent attendance to a cow. On arrival I found a deep wound between the two rear quarters of the udder, which was bleeding freely, apparently result of a horn thrust.

Treatment.—Cow was removed to a loose box and plentifully bedded with clean straw ; was then cast and secured. Examination disclosed a deep wound in the udder about 2½ in. long and 7 in. deep, extending forwards and upwards between the rear quarters at about the median septum. Hæmorrhage was very great. Wound was thoroughly cleansed with an antiseptic solution, then plugged with carbolised tow, which had been impregnated with p. acid, bor. p., iodof. and P.Z.N. ox. Plug was rammed tightly home until hæmorrhage was arrested. Lips of the wound were then strongly sutured to retain plugs in position, wound was externally dressed, cow allowed to rise and milked out.

Result.—Next day cow was visited. Milk in all quarters was normal. As there was no appreciable swelling, plug was left in position, external wound being dressed twice daily by the cow-man. Three days later stitches and plug were removed, wound dressed, and powder as before left with the attendant. Recovery was uneventful.

Variola in Swine.

During the past three years several cases of a variolous condition in pigs have been met with.

Symptoms.—A vesicular eruption appears on the skin, on the udder in sows usually, and about the muzzles, eyes, inside of thighs, and perhaps over almost the whole body in others, especially sucking-pigs. There is fever, loss of appetite, great depression, a peculiar stiff gait, and a greasy feeling when the skin is manipulated. Catarrh and acute conjunctivitis are the first symptoms seen. Two or three days usually after exposure to infection small red spots appear on the skin. These spots increase rapidly in size and develop hard centres. In another couple of days vesicles appear, which at first contain a clear fluid, and later pus. Later, dark scabs form, which fall off after a few days. The number of spots is very variable, some pigs being covered and others showing only one here and there. The course and result of the disease is also somewhat variable, at least this was so in the cases met with. In some outbreaks a very fatal form of the affection was met with, diarrhœa and pneumonia being prominent symptoms.

Post-mortem.—An acute gastro-enteritis and broncho-pneumonia was seen, in addition to skin lesions. In other outbreaks, which were the more numerous, the condition was milder, only sucking-pigs succumbing. In still others the complaint was apparently innocuous, except in the case of the sucking-pigs, which were attacked more or less severely.

Differential Diagnosis.—The characteristic stages through which the skin lesions pass, if they can be observed, are diagnostic. By these stages they can be distinguished from the skin lesions of swine fever and swine erysipelas and the scabby, eczematous condition sometimes seen on unthrifty swine. This condition of variola may exist concurrently with swine fever or erysipelas, where either or both of these conditions are prevalent.

Treatment.—Affected swine were isolated, as far as practicable. Skin was dressed with soothing and antiseptic topics. Febrifuges were administered internally. Hygiene was also attended to, and a sloppy diet containing milk, if available, prescribed.

Results.—Severely affected, *i.e.* the acute, cases invariably died. Milder cases usually recovered. Recovery was general where local skin lesions were only symptoms seen, as in some sows with affected udders.

Observations.—Inquiries amongst neighbouring practitioners showed that several have met with this condition in swine more or less frequently, one Norfolk veterinary surgeon reporting as many as twenty outbreaks in his area in 1933–34. Another fact noted is that pigs in the incubative stage of variola invariably succumb to acute peritonitis if operated on by castration or spaying. It would appear that inquiry is needed into this disease with a view to establishing a reliable method of protective inoculation. No connection with variola vaccinia was obvious in any of the cases under observation. The condition is definitely contagious. Inquiries at various research institutes elicited the opinion that this condition was rare or non-existent in the British Isles. This opinion is at variance with that of several experienced East Anglian practitioners. However, further research into the matter is being set on foot.

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Diabetes Insipidus.

By ARTHUR J. WEIGHTON, M.R.C.V.S.
Hull.

THIS disease, while not common in dogs, is encountered sufficiently often, and its treatment till now has been sufficiently unsatisfactory to be a source of trouble to the practitioner. Some authorities have thrown doubt on the existence of diabetes insipidus in the lower animals, but this view cannot be upheld in the light of experience. Examination of records of the past three thousand medical (as distinct from surgical) cases shows that twenty-three were diagnosed as diabetes insipidus, were treated as described presently, and made uninterrupted recoveries. This percentage is quite a high one for this type of disease, even after allowing a good margin for errors of diagnosis.

All cases observed have been in aged or ageing bitches, and all in small dogs, though this is probably due to their relatively greater numbers. Cases were encountered in about the same numbers in past years, and treatment was confined to strict dieting, reduction of the water allowance, and the internal administration of potassium iodide with stimulants such as Easton's syrup. Working on these lines a fair amount of success was achieved, but the treatment was only palliative at best, and had to be persisted in over a lengthy period. Lately, however, extracts of the pituitary gland have been employed, with very encouraging results. All cases were not kept under personal observation in an infirmary, but among those that were the following is typical:

An Aberdeen terrier bitch, aged about thirteen years, had been losing flesh for about eight weeks. The appetite was uncertain, and the bowel action irregular, usually constipated. Abnormal thirst was shown, and urine was passed in large amounts and frequently. Especially was this so at night, the bitch having apparently lost all control. She was easily tired and panted heavily on slight exertion. Diet consisted of scraps from the table, chiefly fish and meat, mixed with a good quality biscuit and fed to her twice daily. The record of a mild attack of gastritis four years previously was the only medical history available.

On examination the bitch was found to be in poor condition, the coat harsh and dry, and the abdomen pendulous. The tongue was furry and coated, the visible mucous membranes pallid, and slight cataract was present in both eyes. Apart from deposits of tartar on the teeth, no other abnormalities could be detected. The temperature was 101° F., pulse 84, and somewhat irregular, respirations 15. The urine was light-yellow and of a weak acid reaction, specific gravity 1,005, and contained no abnormal constituent. The patient was taken into the infirmary and put on a diet of hound meal with meat and gravy mixed in. She was fed twice daily, and the water supply was not curtailed. One c.c. of pituitrin, P., D. & Co., was injected subcutaneously every evening on four successive days, no other medical treatment being used. Very little improvement was noticed till the third morning, when the bitch was brighter, her thirst very much

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reduced, and the urine in amount and specific gravity approached the normal. She was discharged on the fourth day as cured, and was seen once or twice during the next six months, when she seemed perfectly healthy, and the owner reported that " she had never looked back." A sample of urine submitted a few weeks back had a specific gravity of 1,020.

A lot of work has yet to be done before the exact nature of this condition is clear, but so far as treatment is concerned, the use of pituitary extracts gives every promise of success. They are, of course, contraindicated where nephritis or myocarditis exist, and this fact would limit their general use, since nephritis is common in old animals, though myocarditis is very rare. On the other hand, nephritis has been rarely discovered in post-mortems on animals which in life showed signs of pituitary hypofunction, and it is considered that the percentage of cases in which contraindications to the use of pituitrin were found would be almost negligible.

Obituary

THE LATE PROFESSOR GAIGER.

THE profession of medicine—human as well as veterinary—will learn with deep regret of the untimely death of Sidney H. Gaiger at the early age of fifty, the first Professor to be appointed in the Chair of Comparative Pathology in the University of Liverpool. His place will be hard to fill, for the veterinary profession possesses few men who can claim, as Professor Gaiger did, to have had an equal experience " in the field " as in the laboratory. His knowledge was sound, and, as a good teacher, he was able to impart it to his students. On some diseases he was " the " authority in this country, and his own personal experience of glanders, to which he fell a victim whilst in India some twenty years ago, can be stated without fear of contradiction to be unique ; as he ultimately, after a desperate and determined battle, made an excellent recovery—a most rare sequel—although Professor Gaiger did this only after some forty-two operations, which left him minus one arm and some fingers of the other hand. Notwithstanding these severe handicaps, he was an indefatigable and careful worker, not only in the laboratory, but also in the field ; and yet found time to enter the Council of the profession, and to sit, as its Chief Magistrate, in the Presidential Chair—a position he occupied with dignity. The deepest sympathy of the profession will go to his sorrowing wife and family.

Reviews

Encyclopædia of Veterinary Medicine and Surgery and Obstetrics. Edited by PROFESSOR GEORGE WOOLDRIDGE, F.R.C.V.S., M.R.I.A. Second edition. Pp. 1,652 of text, and 362 Illustrations. London : Oxford University Press. Price £6 6*s*.

FOR many years the veterinary student and graduate who could only read English was compelled to wait for his erudite knowledge of scientific subjects, other than what he surmised himself, until a translation had been made of some foreign text-book, by which time, usually, much advance had been made, leaving the printed work in

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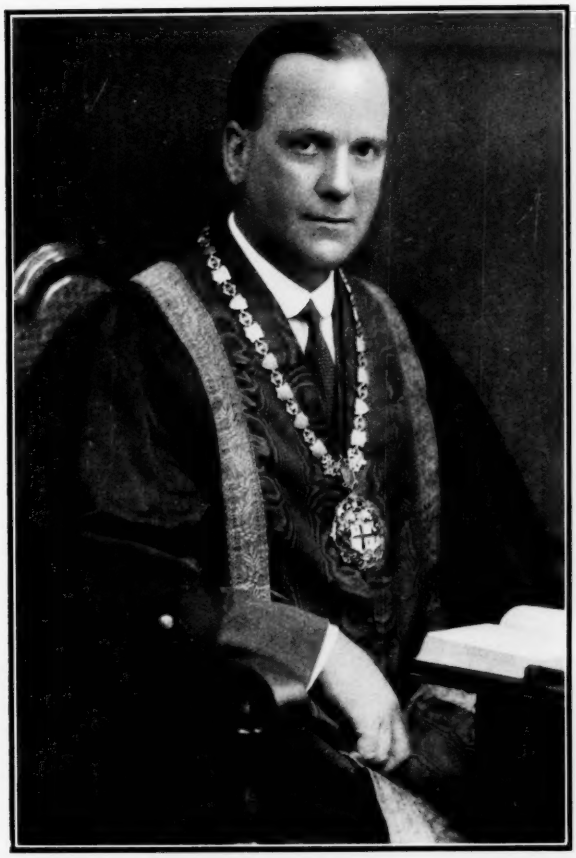

The late Professor Sydney H. Gaiger, F.R.C.V.S.

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question somewhat behind and out of date. Original authors were few, and, indeed, the task of writing a veterinary book is not only a laborious but a costly one, as the audience is small and the sale is slow. For one man to write with authority upon every point of veterinary science is impossible, and Professor Wooldridge has very wisely called in the collaboration and aid of selected colleagues, reserving for his own pen certain subjects in which he is a master, and confining the remainder of his energies to the part of editor. Each of these he has done well, for amongst the list of collaborators are the names of the best writers of the profession; and Great Britain has now a veterinary text-book and work of reference second to that of no other country in the world.

The division of the two volumes into one for medicine and medical subjects and the other for surgery and such like matters is good, and the alteration, too, of the character of the printing has many conveniences for the reader. The work put into it must have been stupendous, and the editor is to be congratulated upon the trait of perseverance, which must have made him give up very many evenings—when otherwise he would have been at play—and burn much midnight oil.

To select paragraphs, or even make comments, on any one part more than another would be superfluous. The whole book is good; and both as a text-book and a work for future reference it should find a handy place, not in a shut-up bookcase, but on a shelf near the arm-chair, where the busy practitioner can consult it at odd hours whenever a puzzling case is in hand.

The Internal Parasites of Domestic Animals. By PROFESSOR THOS. W. M. CAMERON, T.D., M.A., Ph.D., D.Sc., M.R.C.V.S. Pp. 292, with colour plate and 144 illustrations. London: Messrs. A. & C. Black, Ltd. Price 15s. net.

THE latest of the books which Professor Cameron has given to the world of science is not only the work of a master of the subject in regard to technical detail, but is written in the verbiage of a man who has experienced the difficulties of veterinary practice and desires to help his professional brother by the setting forth of laboratory discoveries in such a way—by diagrams and understandable descriptions—that the clinician at once realises the part he must play in the attack on the chain which includes the intermediary hosts.

The study of helminthology has always had a definite comparative—one might almost say veterinary—side, and the Royal Veterinary College at Camden Town always cherishes the name of Cobbold, and is proud that he was once one of its teachers, and of the early encouragement he unselfishly gave to his friend and pupil, Cameron; whilst the work of Leiper has added much to our useful knowledge and has led to the practical application of remedies for the extermination of these detrimental animal pests. Professor Cameron's book is the latest word on the subject, and is arranged in such a way that it is not only a text-book for the student, but a work of handy reference for the practitioner.

Commencing with a brief introductory chapter of explanation on nomenclature and history, it proceeds to deal in turn with the Protozoa, Nematodes, Acanthocephala, Trematodes, and all the varieties of tapeworm so well known to the veterinarian in daily practice. The chapters on immunology, toxins and serology, and the therapeutics of helminthic infections, are of especial value in that they bring up to date all the modern treatments and the dangers incurred by the application of remedies in unskilled hands. The practical advice given here is invaluable. For the student the diagrams of host infection and chapters on technique and host lists, make the work a laboratory text-book. In fact there is only one advice which can be given to every member of the veterinary world who wishes to acquire the latest knowledge on this all-important subject—and this to " buy and read " this text-book.

News

Posts as Veterinary Officers.

SCARCELY a week passes without an advertisement in one or other of our professional or local papers for a position as a whole-time veterinary official, and the following will give some of our younger graduates an idea of their pecuniary value, each being a whole-time job.

Cornwall County Council.—For the examination of dairy herds and other duties. Salary commencing at £600 per annum, rising by annual increments of £25 to £700, with an estimated car allowance of £200 per annum.

Barrow-in-Furness.—Veterinary officer to act as meat inspector, and perform other whole-time duties. Salary £500, rising by £25 annual increments to £575.

Corporation of Birmingham.—Junior assistant. Commencing salary £400 per annum.

West Riding of Yorkshire County Council.—Assistant veterinary inspector. Salary £400, rising to £600.

Personal

BY the death, at the age of eighty-one, of Mr. Henry Phillips, of Ipswich, the Eastern Counties lose one of their most popular sportsmen, and the registered practitioners' list of old-time veterinary surgeons one of its most respected colleagues. Registered as a practitioner under the 1881 Veterinary Surgeons' Act, Mr. Phillips, who was born at Monks Eleigh, was the son of a veterinary surgeon, Mr. Wm. Phillips, M.R.C.V.S., and commenced practice at Ipswich as the partner of Mr. Alfred Shorter, eventually acquiring the practice, which he ultimately shared with his son-in-law, Lieut.-Colonel Castle, F.R.C.V.S., and Mr. Browning. He was extremely popular with all classes, and especially with his brother members, by whom he was universally recognised as the type of a good sportsman.

THE KING has granted Major Charles Rowland Chadwick, M.R.C.V.S., late Inspector-General of Veterinary Services, Iraq, Royal licence and authority to wear the Insignia of the Fourth Class of the Order of Al Rafidain, conferred by the King of Iraq.

DR. YULE BOGUE, Ph.D., M.R.C.V.S., of the Department of Physiology in the Royal Veterinary College, has been elected to the Council of the Society of Experimental Biologists.

MRS. PHYLLIS ROBSON, the popular editor of *The Dog World*, and the representative of the Alghan Hound Owners, has been elected to the Kennel Club Council of Representatives. Mrs. Robson is the first woman to attain this honour.

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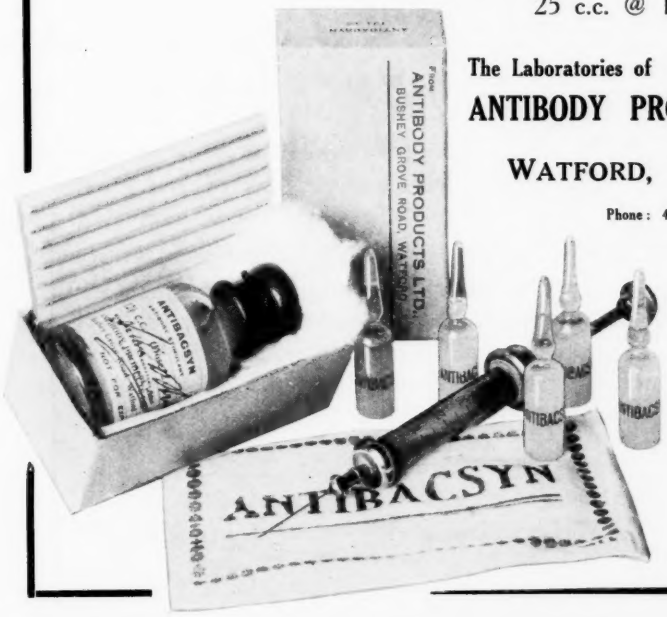

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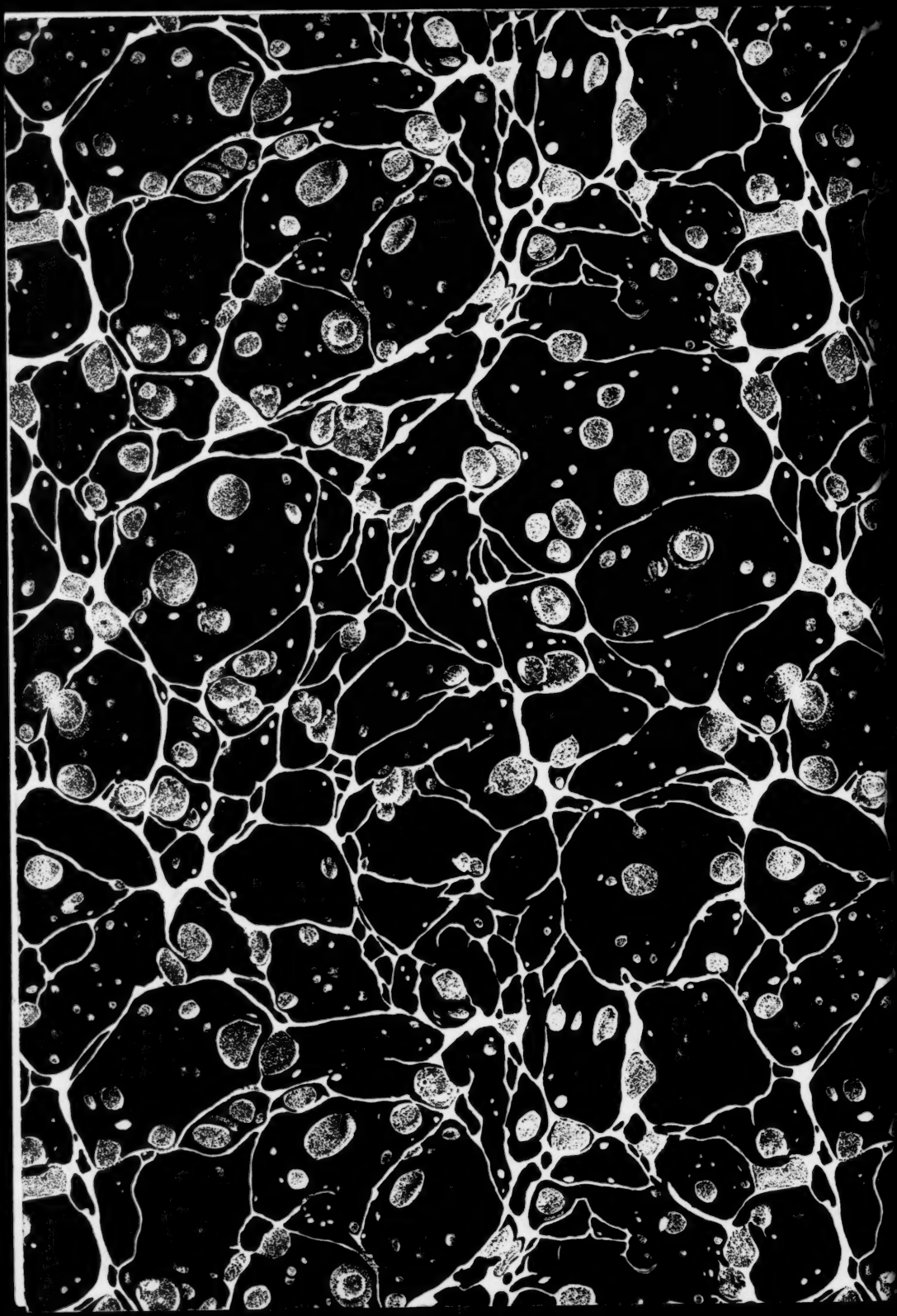

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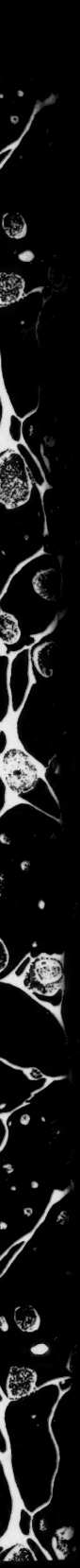

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